

Name: KEY Per: \_\_\_\_\_

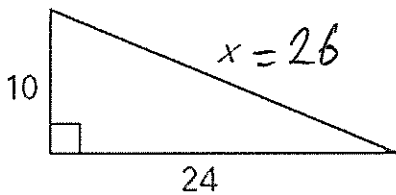
Semester 2 Study Guide

**Geometry**

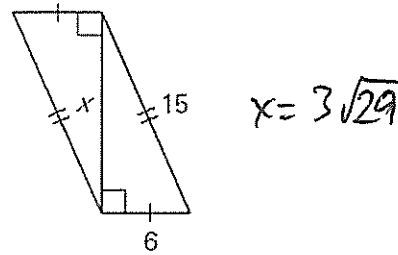
*Due on Finals Day! Also bring your CHEAT SHEET!*

**Pythagorean Theorem**

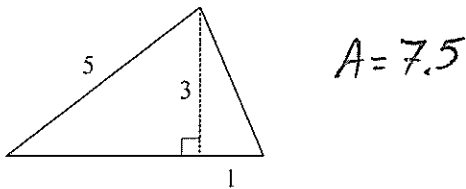
1) Find the missing side length. Reduce all radicals.



2) Find the missing side length. Reduce all radicals.



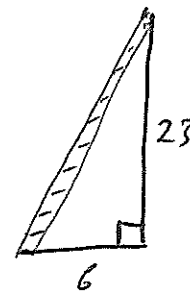
3a) What is the **area** of the triangle below to the nearest tenth?



3b) What is the **perimeter** of the triangle to the nearest tenth?

$P \approx 13.2$

4) The top of a ladder rests against a wall, 23 feet above the ground. The base of the ladder is 6 feet away from the wall. What is the length of the ladder? (Draw & solve)



$\approx 23.77 \text{ ft}$

**5) Pythagorean Triples**

There are a few special right triangles where  $a$ ,  $b$ , and  $c$  are all whole numbers (no radicals). Find them!

Essential Special Triangles:	(multiply by 2)	(multiply by 3)
$a = 3$	$a = 6$	$a = 9$
$b = 4$	$b = 8$	$b = 12$
$c = 5$	$c = 10$	$c = 15$
$a = 5$	$a = 10$	$a = 15$
$b = 12$	$b = 24$	$b = 36$
$c = 13$	$c = 26$	$c = 39$

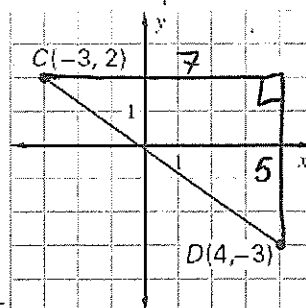
6) A triangle has sides that measure 8, 17, and 15. Is it a right triangle? Prove your answer.

Yes!  $a^2 + b^2 = c^2$

**Distance Formula**

1a) Find the distance of C to D by creating a triangle and using the Pythagorean theorem. Leave in simplified radical form.

$\sqrt{74}$



1b) Find the distance of C to D by using the distance formula. Leave in simplified radical form.

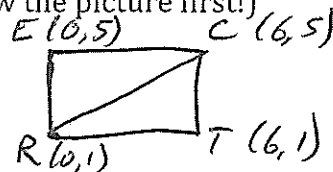
$\sqrt{74}$

2) Find the distance between A(-3, -5) and B(2, 5).

$$\sqrt{125} \approx 11.18$$

3) Use the distance formula to find the length of a diagonal in rectangle RECT having coordinates R (0,1), E(0,5), C(6,5), and T (6,1). (Hint: Draw the picture first!)

- A. 52  
 B.  $\sqrt{52}$   
 C.  $\sqrt{-52}$   
 D.  $\sqrt{16}$



### Trigonometry: Trig & Inverse Trig Ratios (Soh-Cah-Toa!)

1) Find each trigonometric ratio for the given triangle.

$$\sin Z = \frac{8}{17}$$

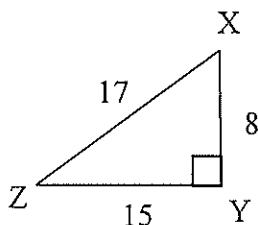
$$\cos Z = \frac{15}{17}$$

$$\tan Z = \frac{8}{15}$$

$$\sin X = \frac{15}{17}$$

$$\cos X = \frac{8}{17}$$

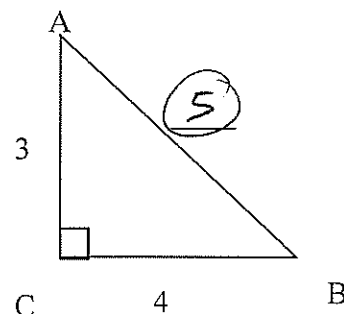
$$\tan X = \frac{15}{8}$$



2) In the figure below,  $\triangle ABC$  is a right triangle with a right angle at  $\angle C$ . Which of the statements about this figure is NOT correct?

- a.  $\cos A = \frac{3}{5}$   
 b.  $\sin A = \frac{4}{5}$   
 c.  $\tan A = \frac{3}{4}$  (4/3)  
 d.  $\cos B = \frac{4}{5}$   
 e.  $\sin B = \frac{3}{5}$

Correct it!



3) Which of the following would find the height of the lighthouse?

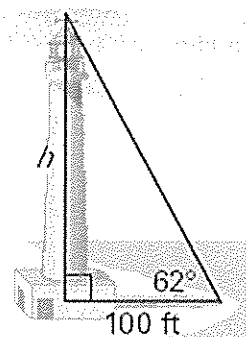
A.  $62 \cdot \tan 100$

B.  $100 \cdot \tan 62$

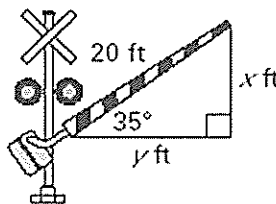
C.  $100 \cdot \sin 62$

D.  $\frac{100}{\sin 62}$

E.  $\frac{100}{\tan 62}$



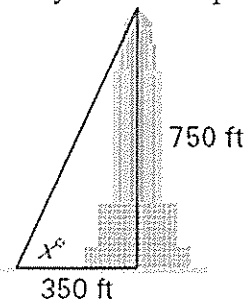
4) A railroad crossing arm that is 20 feet long is stuck with an angle of elevation of  $35^\circ$ . Find the lengths  $x$  and  $y$  to the nearest foot.



$$x = 11 \text{ ft}$$

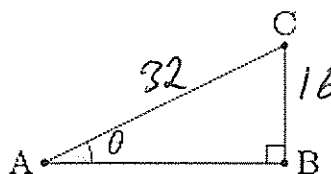
$$y = 16 \text{ ft}$$

5) You are standing 350 feet away from a skyscraper that is 750 feet tall. What is the angle of elevation from you to the top of the building?



$$x = 64.98^\circ$$

6) If side AC is 32 inches and side CB is 16 inches, find the measure of angle theta.

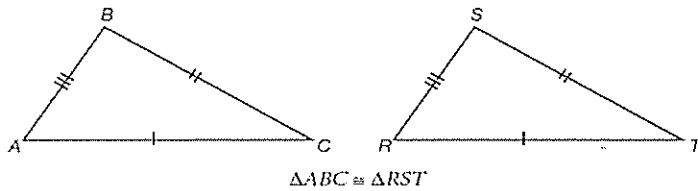


$$\theta = 30^\circ$$

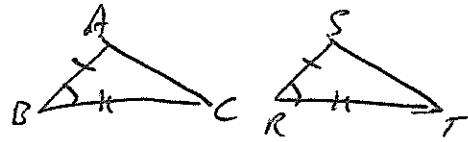
## TRIANGLES: Congruent triangles

Draw an example of each triangle congruency. The first one has been done for you.

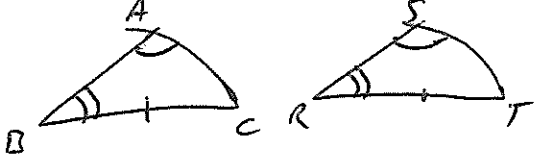
1) Two triangles congruent by SSS.



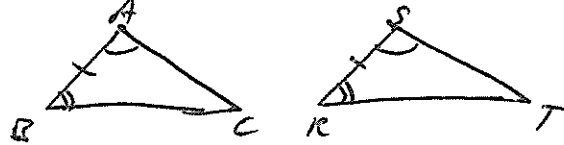
2) Two triangles congruent by SAS.



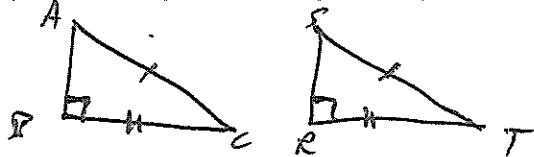
3) Two triangles congruent by AAS.



4) Two triangles congruent by ASA.



5) Two triangles are congruent by HL.



6) What combinations of three angles or sides do NOT prove triangle congruence?

SSA / ASS  
AAA

7) In the figure below, which of the following congruencies must be true?

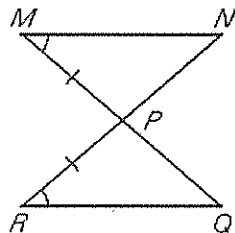
a)  $MP \cong PQ$

b)  $RP \cong PQ$

c)  $MP \cong NP$

d)  $MN \cong RO$

e)  $RP \cong PN$



8) Which of the following congruencies must be true?

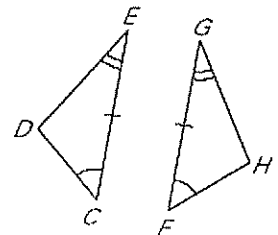
a)  $DE \cong DC$

b)  $GF \cong DE$

c)  $HF \cong GH$

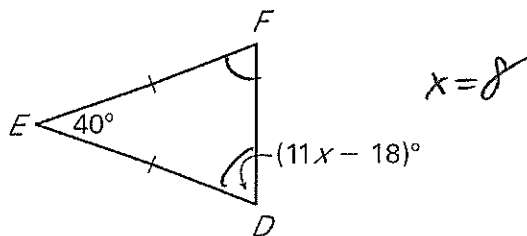
d)  $DC \cong GH$

e)  $ED \cong GH$

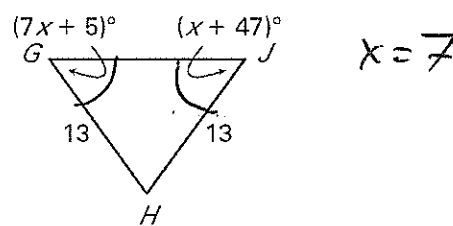


## Triangle Types & Measures

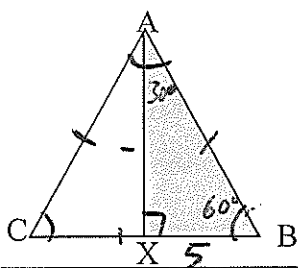
1) Find the value of  $x$  in the isosceles triangle below.



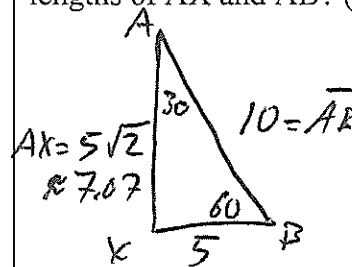
2) Find the value of  $x$ .



3a)  $\triangle ABC$  is an equilateral triangle, and  $\overline{AX}$  bisects  $\angle A$ . Give the measures of ALL the angles in  $\triangle ABX$ .

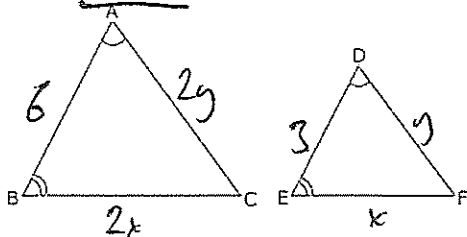


3b) If the measure of side  $BX$  is 5 inches, what are the lengths of  $AX$  and  $AB$ ? (Use the triangle to the left)

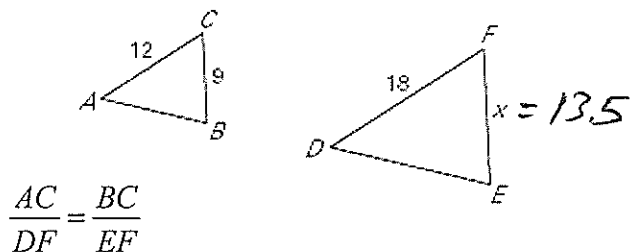


## Proportions & Similar Triangles

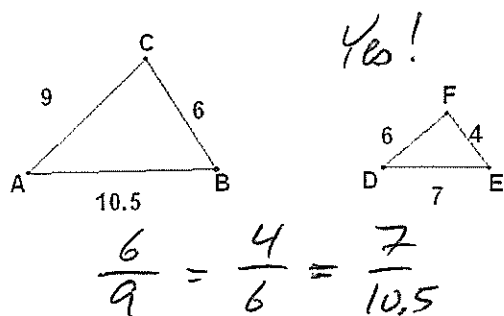
1)  $\triangle ABC \sim \triangle DEF$ . If  $AB = 6\text{mm}$  and  $DE = 3\text{mm}$ , label possible measures of all the other sides.



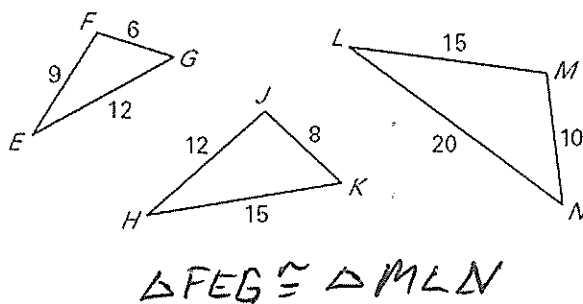
2) Find  $x$ .



3) Are triangles ABC and DEF similar? Prove it!

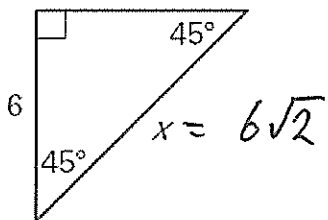


4) Which of the following triangles are similar?

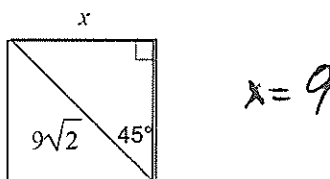


## Special Right Triangles

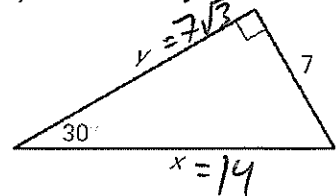
1) Find the value of  $x$ . Leave your answer in simplest radical form.



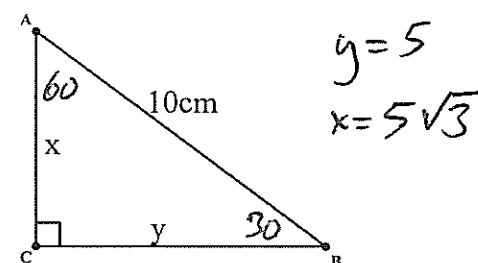
2) If the diagonal of a square is  $9\sqrt{2}\text{ mm}$ , how long is the side length?



3) Find  $x$  and  $y$ .

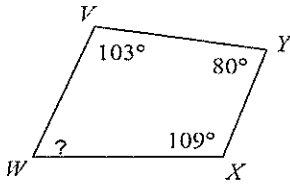


4) If in right triangle ABC,  $\angle A$  is twice the measure of  $\angle B$ , find the lengths of both  $x$  and  $y$ .



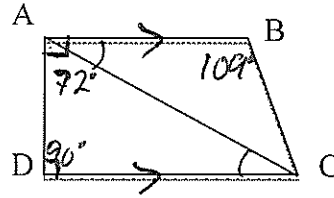
## PROPERTIES OF QUADRILATERALS

1) What is the measure of angle W in the figure below?



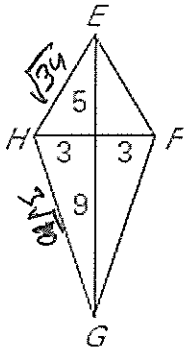
$$m\angle W = 68^\circ$$

2) In the trapezoid ABCD shown below, side lengths AB and DC are parallel,  $\angle DAC = 72^\circ$ ,  $\angle D = 90^\circ$ , and  $\angle B = 109^\circ$ . What is the measure of  $\angle BCA$ ?



$$m\angle BCA = 53^\circ$$

3) Find the area and perimeter of the kite below.



$$A = 42 \text{ units}^2$$

$$P = 6\sqrt{10} + 2\sqrt{34} \approx 30.6 \text{ units}$$

4)

What is the area, in square inches, of the trapezoid shown below?

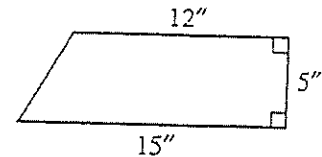
A. 60

B.  $67\frac{1}{2}$

C. 75

D. 80

E. Cannot be determined from the given information



5)

One side of square ABCD is 12 meters long. A rectangle with the same area as square ABCD has a length of 9 meters. What is the rectangle's width, in meters?

F. 3

G. 16

H. 21

J. 108

K. 144

6)

Which of the following gives the lengths, in feet, of the legs of a right triangle that has the same area as a rectangle that is 12 feet by 9 feet?

F. 6 and 4.5

G. 6 and 18

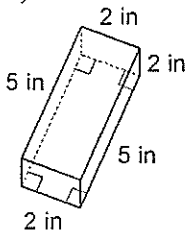
H. 12 and 9

J. 12 and 18

K. 24 and 18

## SURFACE AREA & VOLUME

1) Find surface area and volume of the rectangular prism.



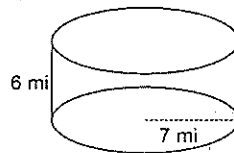
Volume:

$$20 \text{ in}^3$$

Surface Area:

$$48 \text{ in}^2$$

2) Find the surface area and volume of the cylinder (leave it in terms of  $\pi$ )



Volume:

$$294\pi \text{ mi}^3$$

Surface Area:

$$182\pi \text{ mi}^2$$

3) A cube has a volume of  $1728 \text{ cm}^3$ .

a. What is the side length of the cube?

$$12 \text{ cm}$$

b. What is the area of one face of the cube?

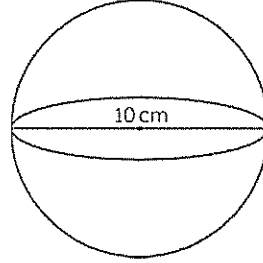
$$144 \text{ cm}^2$$

b. What is the full surface area of the cube?

$$864 \text{ cm}^2$$

4) A cylinder has a diameter of 10cm.

a. Find the volume, exact and then rounded to tenths.



$$166.67 \pi \text{ cm}^3$$

$$\approx 523.6 \text{ cm}^3$$

b. Find the surface area, exact and rounded to tenths.

$$100 \pi \text{ cm}^2$$

$$\approx 314.2 \text{ cm}^2$$

## QUADRATIC EQUATIONS

1. Solve by factoring. What are the roots?

$$y = x^2 - 6x + 8$$

$$x = \{4, 2\}$$

2. Solve by factoring. What are the solutions if  $y=0$ ?

$$y = 3x^2 + 21x + 36$$

$$x = \{-3, -4\}$$

3. Graph  $y = 2x^2 - 6x + 2$ .

Does the parabola open upwards or downwards?

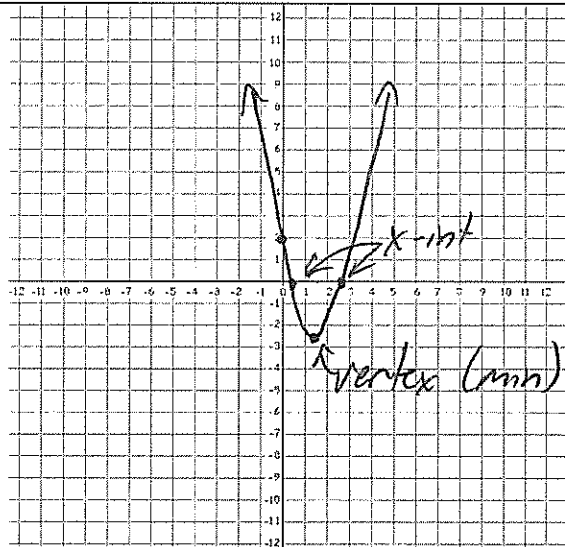
Find the vertex (include if it is a minimum or maximum):

$$\left(\frac{3}{2}, -\frac{5}{2}\right) \text{ min}$$

$$\text{or } (1.5, -2.5)$$

Find the x-intercepts:

$$0.38 \text{ \& } 2.62$$



4. How would the graph of the function  $y = x^2 + 4$  be affected if the function were changed to  $y = x^2 - 3$ ?

A. The graph would shift 4 units up.

B. The graph would shift 3 units down.

C. The graph would shift 7 units down.

D. The graph would shift 4 units to the right.

E. The graph would shift 4 units down.

5. An athlete who is 6.5 feet throws a shot put with an initial vertical velocity of 40 feet per second. The height of the shot put can be modeled by the function  $h(t) = -16t^2 + 40t + 6.5$ . How long will it take for the shot put to hit the ground?

$$2.65 \text{ seconds}$$